

# Deployable Engine Air-Brake for Drag Management Applications, Phase II

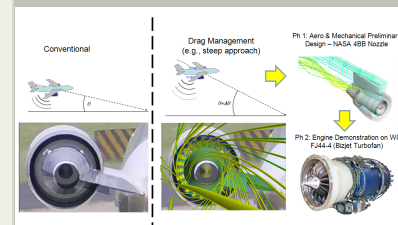
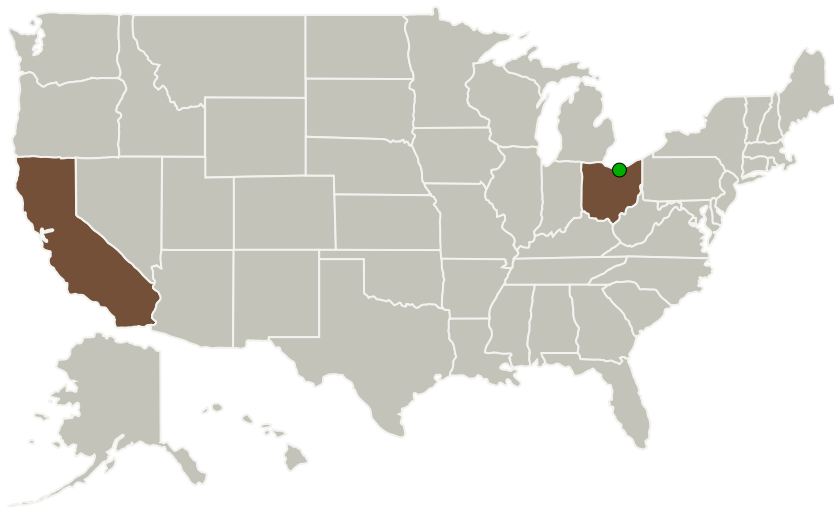
Completed Technology Project (2013 - 2015)



## Project Introduction

ATA Engineering, Inc., (ATA) proposes a Phase II SBIR program to demonstrate an innovative engine air-brake (EAB) technology that uses a deployable swirl vane mechanism to switch the operation of a turbofan engine nozzle from a conventional mode to a "drag management" mode. Equivalent drag (via thrust reduction) results from the strong radial pressure gradient created by swirl vanes that are aerodynamically "invisible" during conventional operation and introduced during a drag management maneuver. Such "drag on demand" enables operational benefits such as slower, steeper, and/or aeroacoustically cleaner flight on approach, addressing NASA's need for active and passive control of aeroacoustic noise sources for conventional and advanced aircraft configurations. In Phase I ATA successfully designed an integrated vane-nozzle for a NASA high bypass ratio nozzle. To advance the technology readiness level (TRL), ATA has formed a partnership with Williams International (WI), a manufacturer of small jet engines and industry leader in the small business jet market. The ATA/WI team will apply the Phase I design approach to the WI FJ44-4 mixed flow turbofan which is selected as a demonstration test article to move the TRL to 5-6 by the end Phase II.

## Primary U.S. Work Locations and Key Partners



Deployable Engine Air-Brake for Drag Management Applications Project Image

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Organizations Performing Work	Role	Type	Location
ATA Engineering, Inc.	Lead Organization	Industry	San Diego, California
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

## Primary U.S. Work Locations

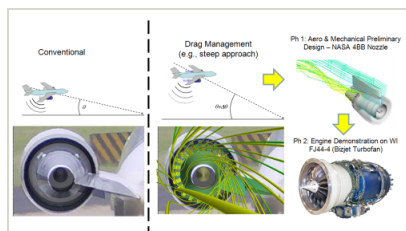
California	Ohio
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## Project Transitions

▶ **July 2013:** Project Start

✓ **October 2015:** Closed out

## Images



## Project Image

Deployable Engine Air-Brake for Drag Management Applications

Project Image

(<https://techport.nasa.gov/image/129832>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

ATA Engineering, Inc.

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

Carlos Torrez

## Principal Investigator:

Parthiv N Shah

## Co-Investigator:

Parthiv Shah

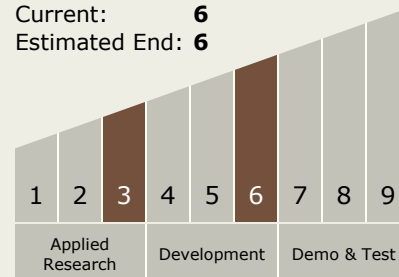
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## Technology Maturity (TRL)

Start: **3**  
Current: **6**  
Estimated End: **6**



## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - └ TX01.3 Aero Propulsion
    - └ TX01.3.1 Integrated Systems and Ancillary Technologies

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System